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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,443	06/07/2001	Franz Ludwig Rauch	1520-006 (1426)	9922

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JAMES MARC LEAS
37 BUTLER DRIVE
S. BURLINGTON, VT 05403

EXAMINER

KIKNADZE, IRAKLI

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 06/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/876,443

Applicant(s)

RAUCH ET AL.

Examiner

Irakli Kiknadze

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2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-25, 27, 37, 38 and 40-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-25 and 27 is/are allowed.
- 6) ☒ Claim(s) 37, 38, 40-43 and 46-50 is/are rejected.
- 7) ☒ Claim(s) 44 and 45 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. In response to the Office Action dated February 27, 2002 the Amendment has been received May 15, 2002.

Claims 28 and 39 have been canceled.

Claims 37 and 44-50 have been amended.

Claims 11-25,27,37-38 and 40-50 are pending in the application.

Response to Amendment

2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

3. Applicant's arguments with respect to claims 37-41 have been considered but are moot in view of the new ground(s) of rejection.

Terminal Disclaimer

4. The terminal disclaimer filed on June 7, 2002 disclaiming the terminal portion of any patent granted on this application, which would extend beyond the

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expiration date of US Patent 6,295,332 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 37,38 and 40-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Terasawa et al. (US Patent 5,222,112).

With respect to claims 37, 38 and 40-42, Terasawa discloses (Fig. 6) a method of exposing a resist on a substrate (11) comprising the steps of:

- a) providing the substrate (11) with a film of resist;
- b) placing the substrate (11) on a stage (12);
- c) providing x-ray radiation from a point source (1) (column 9, lines 25-26) ;
- d) collimating or concentrating (elliptical mirror 2) the x-ray radiation;
- e) providing a mask (3) for defining exposure of the resist;
- f) illuminating the mask (3) with the x-ray radiation after the collimating or concentrating step (d); and
- g) exposing the resist with x-ray radiation passing through the mask (3).

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The X-ray radiation is concentrated, the substrate comprises a wafer (11) and wafer comprises a semiconductor. The mask (3) is spaced from the substrate (11) by a gap, which can be adjusted by moving the stage (12) (column 4, line 21 – column 7, line 53).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 43 and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terasawa et al. (US Patent 5,222,112) in view of Hasegawa et al. (US Patent 6,144,719).

With respect to claims 43 and 46-50, Terasawa generally shows all that is claimed except using a displacement sensor sensing the position of the substrate. Using the displacement sensors sensing the position of the substrate is well known in the exposure methods and devices. Hasegawa discloses (Fig. 1-6) an exposure apparatus and method using a displacement sensor (41) to sense the position of the substrate (10) with relation to mask (20), indicating an optimum gap (the mask (20) is spaced from the substrate (10) by a gap) and controlling mask to wafer misalignment. The displacement sensor output can be used to control substrate x,y,z, rotation, and magnification. The X-ray radiation passes through a beam transport chamber having a

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low pressure (column 4, line 11 – column 9, line 17). It would have been obvious to one ordinary skill in the art at the time the invention was made to provide the displacement sensor sensing the position of substrate of Hasagawa in exposing method of Terasawa in order to improve handling and realigning wafers and other exposure items for tight process controlling and positional accuracy.

Allowable Subject Matter

9. Claims 11-25 and 27 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter: claims 11-25 are allowed because prior art fails to disclose or make obvious a method of exposing a resist on a substrate with a displacement sensor comprising a differential variable reluctance transducer (DVRT).

11. The following is a statement of reasons for the indication of allowable subject matter: Claims 27 is allowed because prior art fails to disclose or make obvious a system for exposing a substrate comprising a stepper and an X-ray source, vibration insulation there between.

12. Claims 44 and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: With respect to claims 44 and 45 prior art fails to disclose or make

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obvious a method of exposing a resist on a substrate with a displacement sensor comprising a differential variable reluctance transducer (DVRT).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Iizuka et al. (US Patent 5,333,167) and Unno et al. disclose the exposure apparatus comprising the displacement sensors.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is (703) 305-6464. The examiner can normally be reached on M-F(8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Irakli Kiknadze
June 20, 2002


ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800